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10/824,195	04/14/2004	Richard John Mitro	GAT 0087 PA/40304.173	5883

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EXAMINER

LANDRUM, EDWARD F

ART UNIT	PAPER NUMBER
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3724

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/824,195

Applicant(s)

MITRO ET AL.

Examiner

Edward F. Landrum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 7,9,15-17,30,34,38 and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8,10-14,18-29,31-33 and 35-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/12/04, 11/12/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 7, 9, 15-17, 30, 34, 38, and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions and species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 6/19/2006.

Claims 9 and 38 have been withdrawn by the examiner because they each claim the oscillation frequency can vary over a range over at least 20 khz and does not define upper or lower limits for the oscillation frequency, unlike the elected species of claim 9 which sets lower and upper limits for varying the oscillation frequency.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 6/12/2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, externally accessible potentiometer, the voltage controlled oscillator, the circular cutting tool, the rectangular cutting tool, the square cutting tool, the triangular cutting tool, the cutting height controller, the object support platform urging the object toward the cutting tool, the

spring-loaded platform, and the magnetic base of the support platform must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. Claims 4, 5, 14, 22 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claims 4 and 14, it is not understood how the variation of the oscillation frequency can be automatically operated. There is no discernable structure, device, program etc defined in the disclosure that could provide this function.

Regarding claim 5, it is not understood how the cutting rate can be observed by an automated system. There is no discernable structure, device, program, etc defined in the disclosure that could provide this function.

Regarding claim 22, it is not understood how the oscillation frequency control can be configured to permit variation of the oscillation frequency across a frequency range including the resonant frequency of the cutting tool. Does this mean that every tool used in the machine has a resonant frequency between 20 and 41 khz? How can the machine find the correct resonance frequency if it is not between 20 and 41 khz?

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 10, 13, 14, 18-22, 24, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi et al (U.S Patent No. 5,101,599), hereinafter Takabayashi in view of Devine (U.S Patent No. 4,409,659).

Takabayashi teaches (see Figures 1 and 2) an object support platform (54) and an object table (52), a cutting tool mount (26) with a cutting tool (14) secured to it, and a piezoelectric transducer (12) is configured oscillate the cutting tool (14) along a cutting

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axis that is perpendicular to an object support plane. An oscillation frequency control (see Figure 2) has a voltage controlled oscillator (30) that is coupled to the drive unit (12). Furthermore, Takabayashi teaches matching the oscillation frequency of the cutting tool with a resonant frequency of the cutting system (Col. 2, lines 6-16)

Takabayashi teaches all of the elements of the current invention as stated above except the oscillation frequency control permitting variation of the oscillation frequency, where the cutting rate can be observed by both audible and visual signals, and where the oscillation frequency can be varied either automatically or manually. More specifically the oscillation frequency can be varied at increments of less than 0.2 khz. Takabayashi further fails to teach the specific electronic circuitry of the voltage controlled oscillator, and the cutting tool being removable.

Devine teaches (Col. 1, lines 30-40) that it is old and well known in the art to use and audible and visual observations to help set the oscillation frequency of the cutting tool manually. Devine further teaches replacing manual adjustment of oscillation frequency with an automatic program (Col. 2, lines 30-60).

It would have been obvious to have modified Takabayashi to incorporate the teachings of Devine to provide a means manually or automatically adjust the oscillation frequency make the ultrasonic cutter more efficient. Furthermore using audible or visual signals to identify problems with cutting efficiency would help identify broken tool bits as well as identify weather an object being cut was too hard or the tool bit was too soft to be cut effectively.

It would have been an obvious matter of design choice to modify Takabayashi by having the voltage oscillator comprising a control voltage input section, a voltage controlled oscillator stage, and a power drive section, since applicant has not disclosed that having this specific circuit structure solves any stated problems or is for any particular purpose and it appears that the oscillating cutter would perform equally well with almost any circuit configuration provided the voltage controlled oscillator still performed the same function.

It would have been an obvious matter of design choice to modify Takabayashi by making cutting tool detachable from the cutting tool mount, quick release tool mounts are old and well known in the art and applicant has not disclosed that having the cutting tool be removable solves any stated problem or is for any particular purpose and it appears that the cutting machine would work equally well with or without the cutting tool being detachable from the tool mount.

It would have been an obvious matter of design choice to modify the modified device of Takabayashi by allowing for the oscillation frequency to be changes in increments of less than .2 khz, since applicant has not disclosed that having the size of the increments the oscillation frequency can be changed by solves any stated problem or is for any particular purpose and it appears that the cutting tool would perform equally well with the oscillation frequency changing in almost any reasonably sized increment.

7. Claims 8, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device of Takabayashi in view of Calkins (U.S Patent No. 5,303,510).

The modified device of Takabayashi teaches all of the elements of the current invention as stated above except the oscillation frequency being able to vary between 20 and 41 khz, and the object support platform configured to accommodate slurry from a slurry supply.

Calkins teaches (Col. 1, lines 12-25) teaches that a standard ultrasonic tool is oscillated in a range of 20-40 khz if using a slurry in the cutting process. Calkins also teaches (see Figure 3; Col. 4 lines 41-61) the use of a cutting slurry (30) being conveyed to a work piece from a slurry supply (24).

It would have been obvious to have modified the modified device of Takabayashi to incorporate the teachings of Calkins to allow the oscillation frequency of the cutting tool to vary between 20 and 40 khz if a slurry was being used thereby allowing the cutting tool to cut at the most efficient frequency thereby increasing the overall effectiveness of the slurry. Furthermore, providing slurry and having a supply of slurry readily available would increase the overall effectiveness of the cutting process by allowing particles already cut to be removed from the work piece, thereby making the cutting process for efficient.

8. Claims 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device of Takabayashi in view of Hansen et al (U.S Patent No. 6,227,853), hereinafter Hansen.

The modified device of Takabayashi teaches all of the elements of the current invention as stated above except the use of a potentiometer to change the oscillation frequency.



Hansen teaches (Col. 16, lines 66-67; Col. 17, lines 1-7) that it is old and well known in the cutting art to use a potentiometer to adjust the power delivered from one system to another.

It would have been obvious to have modified the modified device of Takabayashi to incorporate the teachings of Hansen to use a potentiometer to adjust the oscillation frequency of the cutting unit. It is old and well known to use potentiometers to the adjust frequencies of televisions and radios, and the same would using a potentiometer for the same purpose of adjusting the frequency to an output would make the device much more user friendly.

9. Claims 23, and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device Takabayashi in view of Baba et al (U.S Patent No. 5,177,902), hereinafter Baba.

The modified device of Takabayashi teaches all of the elements of the current invention as stated above except the use of a circular, square, rectangular, or triangular cutting tool and the cutting device comprising a cutting depth indicator.

Baba teaches (see Figure 6) the use of a rectangular cutting tool in an ultrasonic machine to provide the proper tool for a ceramic grinding operation, as well as the ability to control the tool along the x, y, and z axes. Baba further teaches (Col. 2, lines 4-55; Col. 4, lines 25-30 and lines 59-68) the ultrasonic cutter can provide the accurate width and depth of the cutting tool using the oscillator (36), the amplitude controller (38), the pc (34), and the amp (30).

It would have been obvious to have modified the modified device of Takabayashi to incorporate the teachings of Baba to provide a rectangular cutting tool for more efficient grinding, a cutting height controller to better and more accurately move the cutting tool in and out of a cutting location, and an electrical system that allowed a computer and a user to monitor the cutting amplitude/depth to make sure the cutter has not cut too deep to provide an overall more uniform cut. The change in amplitude of the cutting depth during oscillation would automatically show a cutting rate and is an obvious byproduct of an amplitude indicator. Furthermore, these parts are all already found on standard computer numerically controlled (CNC) machines and it would have been obvious to incorporate a standard CNC interface to a ultrasonic cutter such as the modified device of Takabayashi to allow for a user to create programs from commercial software to accurately and easily cut materials in the machine.

10. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device of Takabayashi in view of Donner (U.S. Patent No. 2,546,390).

The modified device of Takabayashi teaches all of the elements of the current invention as stated above except the object support platform being able to urge the object being cut toward the cutting tool, more specifically the object support platform being spring loaded.

Donner teaches (see Figures 3-6) an object support platform (54) being spring biased (57) urging a material (S) towards a cutter (58) to keep the material being cut above a set of ejector fingers (64)

It would have been obvious to have modified the modified device of Takabayashi to incorporate the teaching of Donner to make the object support platform spring biased thereby allowing a material to be cut by the ultrasonic cutter before being forced onto an ejector which would remove the cut material from the cutting region thereby preventing injury by allowing a user to keep hit extremities out of the cutting region.

11. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified device of Takabayashi in view of Hahn et al (U.S Patent No. 5,490,810), hereinafter Hahn.

The modified device of Takabayashi teaches all of the elements of the current invention as stated above except the object support platform having a magnetic base.

Hahn teaches (see Figure 3; Col. 6, lines 5-26) teaches the use of a magnet on the base of an object support platform.

It would have been obvious to have modified the modified device of Takabayashi to incorporate the teachings Hahn to provide a magnetic base for the object support platform. The magnetic base would prevent the vertical movement of a metal work piece up along the axis of oscillation but would allow a user to move a work piece along the plane of the object support platform to allow the ultrasonic cutter to easily cut pieces at different angles.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Erlenmaier (U.S Patent No. 4,951,375), Kostar et al (U.S Patent No. 6,932,682), Jugler (U.S Patent No. 3,561,462), Sherry (U.S Patent No. 3,595,453), Horton (U.S Patent No. 3,679,526), Benderly (U.S Patent No. 6,612,906), and Rozdilsky (U.S Patent No. 3,699,719) teach elements of the instant application.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward F. Landrum whose telephone number is 571-272-5567. The examiner can normally be reached on Monday-Friday 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Boyer Ashley can be reached on 571-272-4502. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EFL  
8/2/2006



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SUPERVISORY PATENT EXAMINER